

cerning economically important plants. This advantage has been utilised by Prof. Kraemer to the fullest extent; indeed, it might be considered by some to have been carried rather too far, for the section on the "Classification of Angiosperms" deals with medicinal plants only. The botanical portion of the work is well written and abundantly illustrated; it is characterised by the comparatively small amount of attention given to the lower forms of vegetable life, the algæ and fungi occupying only thirty-six pages, whereas in text-books of botany these two groups are usually treated in detail that is often considered unnecessary for the pharmacognosist.

Part ii., "Pharmacognosy," is subdivided into four chapters, dealing respectively with crude drugs, powdered drugs, reagents, and micro-analysis. As the first chapter comprises only 178 pages, and deals with a large number of crude drugs, it is evident that the space allotted to each can be but small. The descriptions of the drugs are accordingly very concise, and the methods by which those that are unorganised are produced have been perhaps unduly reduced, but the constituents have received careful and sufficient treatment. Thus the accounts of the production of such important drugs as aloes, catechu, guaiacum, rubber, &c., can convey to the mind of the student but an imperfect idea of the various steps in the processes and their effect upon the drug obtained. To these details a little more space might well be given without unduly increasing the size of the work. Credit, however, must be given to the author for including a large number of drugs of comparatively rare occurrence, and thus making this section of the work more complete than is usually the case with text-books designed for the use of the student. Chapter ii., dealing with powdered drugs, has also been much elaborated. In addition to those with organised structure, it includes a number of structureless drugs (aloes, myrrh, &c.), as well as a few definite chemical compounds. The key to their identification, based primarily upon the colour, is one of the most complete that has been published. The chapter is abundantly illustrated, and contains descriptions of the microscopical characters of so many drugs that it cannot fail to be of service to the experienced microscopist as well as to the student.

Chapter iv., "Micro-analysis," deals with the identification of the crystals found in drugs and their preparations by crystallographic methods, and the time has arrived when these methods must be adopted in the study of such crystals if any real progress in that direction is to be made. It is undeniable that at present the crystals observed in drugs are often very loosely described, and that their identification frequently rests on very insufficient grounds. This part also includes the description and illustration of the crystalline forms of a number of active constituents of drugs, such as brucine sulphate, codeine sulphate, cubebin, &c., and is to be regarded as suggestive (which is certainly the case) rather than as complete.

It will thus be seen that Kraemer's text-book is a valuable contribution to the literature of pharmacognosy. It shows how medicinal plants may be

utilised in the study of botany; it deals with a large number of drugs; it gives instruction in their identification in the powdered state, and it suggests lines upon which microscopical investigation may be prosecuted. The author is to be congratulated on the success of his labours.

HENRY G. GREENISH.

#### THE CHEMISTRY OF BLEACHING.

*The Principles of Bleaching and Finishing of Cotton.*

By S. R. Trotman and E. L. Thorp. Pp. xii+347.

(London: C. Griffin and Co., Ltd., 1911.) Price 16s. net.

THE book before us is an attempt to blend an account of the most recent advances in the processes of bleaching and finishing of cotton goods with an equally up-to-date account of the scientific principles which form the basis of these processes. Such an attempt is comparatively rare in connection with manufacturing processes, and on that account alone the book ought to be welcomed. But when, as we find, the attempt has been highly successful, the authors must be congratulated on having produced a work of great value to all concerned in this important industry.

The book opens with an account of the structure and composition of cotton fibre, the means of testing its strength, twist, &c., followed by an account of the carbohydrates, such as starch and the sugars which are of importance to the bleacher. A full account is given of the different kinds of water, and of the means of treating it so as to make it suitable for bleaching purposes. The importance of the quality of water supplied to the works is too often overlooked by the bleacher, who ought to know that good results in bleaching largely depend on the quality of water used, and that the pure white required for some goods cannot be obtained if certain waters are used.

One of the most interesting chapters in the book is that in which the influence of bacteria in bleaching is discussed. The authors show that cotton may be infected with bacteria at almost every stage of its manufacture, and the principal causes are the following:—

- (1) Impure water for steeping.
- (2) Incomplete removal of protoplasmic constituents during bleaching.
- (3) Allowing goods to lie about in a damp condition, especially in warm weather.
- (4) Insufficient cleanliness of plant or buildings.
- (5) The use of inferior materials, e.g. low-grade starches and glues.
- (6) The careless storing of finished goods.

The results of bacterial damage are frequently coloured spots, each spot being a colony of the organism. Sometimes the whole piece of cloth becomes infected, and has the appearance of having been dyed. A piece of lace examined by the authors left the finisher apparently perfect, but subsequently developed a pink colour.

"A microscopic examination showed the presence of numerous very fine hyphæ interlaced with the cotton fibres, and subsequent plate cultures upon a starch medium similar to the dress used for the lace proved the presence of a chromogenic mould, which was

capable of producing the observed pink colour. The point was conclusively proved by infecting sound lace with the organisms."

Further, it was found that the presence of acid was necessary to develop the colour, which only appeared after about fourteen days. This explained how the goods were passed as perfect by the finishers. Naturally much space is devoted to the treatment of the cloth before the actual bleaching and to the materials and plant used in these processes. The importance of securing purity in the materials used is insisted on, and regular testing recommended. Full details are given of the Kiers used for lye boiling and washing, and there are excellent illustrations of the most improved forms of plant.

Much attention is given to the various bleaching agents, and particularly to bleaching powder. The controversy as to its composition is carefully considered, but cannot yet be said to be finally settled. Reference is made to the very recent work of R. L. Taylor (Chemical Society's Journal, 1910, p. 2541), who has shown that the action of carbon dioxide on bleaching powder liberates chlorine only and not hypochlorous acid, as had usually been supposed. On the other hand, S. H. Higgins maintains that hypochlorous acid does enter into the bleaching action (Chemical Society's Journal, 1911, p. 858).

Limitations of space will not allow us to refer to other portions of the book. Suffice it to say that the use of other bleaching agents, such as sodium hypochlorite ozone, sodium peroxide, potassium permanganate, &c., is referred to, and there is a full account of the bleaching by electrolytic solutions, and a discussion of the economy of the process. The book will be of special use to bleachers who have a sufficient knowledge of chemistry to understand the theoretical portions.

#### SYSTEMATIC PSYCHOLOGY.

*A First Book in Psychology.* By Prof. Mary Whiton Calkins. Pp. xvi+419. (New York: The Macmillan Company; London: Macmillan and Co., Ltd., 1910.) Price 8s. net.

*Erkenntnistheorie.* Von Prof. E. Dürr. Pp. viii+362. (Leipzig: Quelle und Meyer, 1910.) Price 8 marks.

MISS CALKINS is well known among psychologists for her treatment of psychology as the science of selves rather than as the science of mental processes. In her view, the science is best treated as "a study of conscious selves in relation to other selves and to external objects—in a word, to their environment, personal and impersonal." The aim of the present book is to give a systematic account of the various psychological topics, ordinarily treated in introductory text-books, from this point of view. As might be anticipated, Miss Calkins is least successful in her method when dealing with perception, imagination, memory, and thought, although the special point of view gives an added significance to the facts, and brings a new interest for those students who have already become familiar with the ordinary descriptions. When dealing with the more individualising and active forms of consciousness—emotion, will, belief, and the

religious consciousness—the author is able to benefit by her method to the full, and gives the impression of concreteness and reality so often missing in the descriptions of these aspects of conscious life. There is no chapter specially devoted to the nature of the self, but many facts generally given under this head are very fully discussed in a section on "Abnormal Psychology" in the appendix. This appendix forms quite a third of the entire volume, and contains masses of detail the enumeration and discussion of which might obscure the general line of argument. It adds very greatly to the value of the book, and is clearly arranged, and well provided with figures and diagrams. The final section contains a large number of good "review questions."

Prof. Dürr's book, though written from the psychological point of view, does at least equal justice to the metaphysical issues involved in the problem of knowledge. It is divided into three long chapters entitled, "Die Psychologie des Erkennens," "Die Wertlehre des Erkennens," and "Die Gegenstandslehre des Erkennens" respectively, and under each of these headings numerous subdivisions occur. The book cannot be accused of lack of system, and in some respects forms a compendium of philosophy with the historical and critical methods about equally represented. Its first hundred pages on the psychology of thought, however, lift it far above the ruck of ordinary philosophical text-books, and make it of the greatest value to the psychologist. The difficulties attending the various possible theories of outer perception and inner perception (introspection) are exhaustively discussed, though in small compass, and the peculiar psychological problem involved in the case of memory and recognition is clearly stated, and a solution of it attempted. Under the sub-heading "Thought," theories of abstraction, judgment, inference, and induction are briefly considered. Several paragraphs are devoted to the question of the relation of knowledge to belief. Notes at the end of the volume give the necessary references to current literature, and in many cases continue the discussion in greater detail. The one criticism to which the book is open is that difficulties are treated in too summary and dogmatic a fashion. For conversational classes or "seminars" in philosophy and general psychology, the book should prove invaluable. There is certainly no single book in English of a similar kind at the present time.

W. B.

#### OUR BOOK SHELF.

(1) *Introduction to Science.* By Prof. J. Arthur Thomson. Pp. vi+256.

(2) *Astronomy.* By Arthur R. Hinks. Pp. vi+256. (Home University Library of Modern Knowledge.) (London: Williams and Norgate, 1911.) Price 1s. net each.

(1) PROF. THOMSON has prepared an admirable introduction to the scientific section of the series of which he is joint-editor. He has an inspiring gospel to expound, and has proved himself a worthy apostle of it. Science stands for truth and righteousness, for exact observation, for progress at all costs, for that divine discontent with existing knowledge which stimulates persistent inquiry into the unknown, and